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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/737,201	12/16/2003	Kenneth J. LaBry	144.011	5739

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EXAMINER	
HUGHES, SCOTT A	

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/737,201	LABRY, KENNETH J.	
	Examiner	Art Unit	
	Scott A. Hughes	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-23* is/are allowed.

6)☒ Claim(s) *1-3 and 9-15* is/are rejected.

7)☒ Claim(s) *4-8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "the third acoustic fan beam" in the second sentence of the claim. There is insufficient antecedent basis for this limitation in the claim. In claims 1 and 2, the steps of producing the first and second acoustic fan beams are stated. There is no such step for the production of a third acoustic fan beam. For the purpose of rejection over prior art, claim 3 will be interpreted as containing a step for producing a third acoustic fan beam before the recitation of "wherein said third set of sample readings are representative of the reflection of the perpendicular incidence of the third acoustic fan beam and the inner tubular wall."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, and 9-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Priest.

With regard to claim 1, Priest discloses a method for acoustically logging a tubular 4 (Fig. 2) for an interface with a material 32, wherein the tubular is disposed in a borehole 2 so that an annulus is formed between the tubular and the borehole and the material is disposed within the annulus (Fig. 2). Priest discloses producing a first acoustic fan beam from an acoustic sensor located in the tubular, recording a plurality of sample readings, and establishing a first time gate corresponding to a first set of sample readings (Column 3, Line 42 to Column 4, Line 6; Column 4, Lines 34-53). Priest discloses that the first set of sample recordings is representative of the reflection of a perpendicular incidence of the acoustic fane beam and the inner tubular wall (Column 4, Lines 1-6). Priest discloses recording the first time gate (Column 4, Lines 34-53), rotating the acoustic sensor (Column 3, Lines 59-68; Column 4, Lines 50-53), and producing a second acoustic fan beam from the acoustic sensor (Column 3, Line 59 to Column 4, line 6). Priest discloses rotating the transducer to evaluate the circumference of the casing by transmitting acoustic pulses at the different rotations.

With regard to claim 2, Priest discloses establishing a second time gate corresponding to a second set of sample readings, wherein the second set of sample readings are representative of the reflection of the perpendicular incidence of the second acoustic fan beam and the inner tubular wall. Priest discloses recording the second time gate (Columns 3-4). Priest discloses rotating the transducer and activating it to send perpendicular pulses in order to evaluate the entire circumference of the

casing. This means that a second time gate is established for readings taken when the transducer is rotated from the position used for the first reflections.

With regard to claim 9, Priest discloses a system for determining the integrity of an interface to a tubular (Fig. 2). Priest discloses an acoustic fan beam generator 24 for generating an acoustic beam (Figs. 2-3g), the beam generator located on a tool 10 within the tubular 4, and wherein the beam generator generates a sonar data set, with the beam generator recording the sonar data set (Column 4, Lines 34-53). Priest discloses a surface processor 9 receiving the sonar data set via a telemetry means 6 for transmitting the sonar data set from within the tubular to a surface processor (Column 3, Lines 29-40; Column 4, Lines 40-53). Priest discloses a time gate means, operatively associated with the surface processor for establishing a time gate defining a window sample that is inclusive of samples representing compressional wave reflections from the perpendicular incidence of the acoustic beam and the first contact with an inner wall of the tubular (Column 4, Line 34 to Column 5, Line24; Column 8, Line 50 to Column 9, Line 40).

With regard to claim 10, Priest discloses that the beam generator comprising a rotating transducer for rotating in a 360 phase within the tubular (Column 3, Line 59 to Column 4, Line 6).

With regard to claim 11, Priest discloses means 21, 26, operatively associated with the beam generator, for recording the sonar data set (Column 4, Lines 34-48).

With regard to claim 12, Priest discloses that the telemetry means is an electric line 6 connected at a first end to the acoustic fan beam generator 24 and at a second

end to the surface processor 8 (Fig. 1) (Column 3, Lines 29-41). Priest discloses that the surface processor contains means for converting the sonar data set to an amplitude file (Column 4, Lines 45-55; Column 9, Lines 1-23). Priest discloses that the magnitude or amplitude of the signals is recorded and processed at the surface.

With regard to claim 13, Priest discloses that the surface processor includes an amplitude comparing means for comparing the amplitude file of the sonar data set (Column 1, Lines 15-41).

With regard to claim 14, Priest discloses that the beam generator time tags the data set and the surface processor synchronizes the time tagged data set with the amplitude file (Column 1, Lines 15-41).

Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Maki (5874676).

With regard to claim 1, Maki discloses a method for acoustically logging a tubular for an interface with a material, wherein the tubular is disposed in a borehole so that an annulus is formed between the tubular and the borehole and the material is disposed within the annulus (abstract). Maki discloses producing a first acoustic fan beam from an acoustic sensor located in the tubular, recording a plurality of sample readings, and establishing a first time gate corresponding to a first set of sample readings (Column 3, Lines 36-56, Column 6). Maki discloses that the first set of sample recordings is representative of the reflection of a perpendicular incidence of the acoustic fane beam and the inner tubular wall (Column 5) (Fig. 4). Maki discloses recording the first time

gate (Column 6, Line 56 to Column 7, Line 10), rotating the acoustic sensor, and producing a second acoustic fan beam from the acoustic sensor (Column 8, Lines 36-49).

With regard to claim 2, Maki discloses establishing a second time gate corresponding to a second set of sample readings, wherein the second set of sample readings are representative of the reflection of the perpendicular incidence of the second acoustic fan beam and the inner tubular wall. Maki discloses recording the second time gate (Column 8, Lines 36-49). The second pulse at the rotated angle would be analyzed in the same way as the first pulse disclosed in the rejection of claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Priest.

With regard to claim 3, Priest does not specifically disclose positioning the sensor at a second depth and taking a third time gate made up of a third set of reflection readings. Priest does disclose that because cracks, voids, and other problems of the filler material can exist, measurements are taken at multiple locations (Column 9, Lines

54-66). It would have been obvious for the multiple locations to include different depths since boreholes are long and cracks or voids can occur at any depth. Priest discloses establishing a third time gate corresponding to a third set of sample readings, wherein the third set of sample readings are representative of the reflection of the perpendicular incidence of a third acoustic fan beam and the inner tubular wall. Priest discloses recording the third time gate. Priest discloses recording a depth of acquisition corresponding to the depth of acquiring the plurality of sample readings. Priest discloses time tagging the first, second and third time gate. Priest discloses matching the first, second and third time gate to a depth of acquisition within the tubular (Columns 3-4).

With regard to claim 15, Priest discloses that the rotating transducer obtains samples at different rates (Column 9). Priest does not disclose that this rate is 35KHz, but does disclose that the number of samples recorded per revolution is related to the telemetry and processing speeds. It would have been obvious to acquire data at a rate of 35 KHz if the processor and telemetry could transmit data that quickly.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maki (5874676).

With regard to claim 3, Maki discloses positioning the acoustic sensor at a second depth (Column 8, Lines 36-49). Maki discloses establishing a third time gate corresponding to a third set of sample readings, wherein the third set of sample readings are representative of the reflection of the perpendicular incidence of a third

acoustic fan beam and the inner tubular wall. Maki discloses recording the third time gate (Columns 3, 6). The third pulse at the different depth would create reflections that are put into a time gate and analyzed the same way as the first pulse described above. Maki does not disclose recording a depth of acquisition corresponding to the depth of acquiring the plurality of sample readings, but does disclose that the depth is changed and it would be obvious to record the depth at which the signals are recorded in order to know what areas of the borehole have been evaluated. Maki discloses time tagging the first, second and third time gate (Column 7, Lines 39-56; Column 6, Lines 56-68; Column 8). Maki discloses a timing controller that signals when to generate the pulses and times when the signals are created. This timing data is transmitted to the processors, and therefore the timing of the reflection events is tagged. Maki does not disclose matching the first, second and third time gate to a depth of acquisition within the tubular, but does disclose marking the timing of each pulse emitted by the transducer and recording this timing in the processor. It would have been obvious to record the depth at which first, second and third time gates corresponding to the reflected signals in order to determine which part of the borehole each processed signal represents. If this were not done, then an image of the borehole and a determination of the quality of the interface with the cement could not be determined since the signals recorded would not be able to be matched to the actual borehole.

Claims 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maki (5874676) in view of Priest.

With regard to claim 9, Maki discloses a system for determining the integrity of an interface to a tubular (abstract). Maki discloses an acoustic fan beam generator 70 for generating and acoustic beam, the beam generator located on a tool 10 within the tubular, and wherein the beam generator generates a sonar data set, with the beam generator recording the sonar data set (Column 3, Lines 36-56). Maki discloses a time gate means, operatively associated with the surface processor for establishing a time gate defining a window sample that is inclusive of samples representing compressional wave reflections from the perpendicular incidence of the acoustic beam and the first contact with an inner wall of the tubular (Column 2, Lines 35-48; Column 6 Line 56 to Column 7, Line 10). Maki does not disclose a surface processor receiving the sonar data set via a telemetry means for transmitting the sonar data set from within the tubular to a surface processor, but does disclose that this is a possibility for this type of signal (Column 8, Lines 25-35). Maki discloses a microprocessor on the tool that processes the data instead of telemetry to a surface processor (Column 8, Lines 50-54). It is known in the art that processing of data can take place downhole in a microprocessor in the tool, or that the data can be sent via telemetry to a similar processor on the surface as taught by Priest (Column 9) (also disclosed by Maki, Column 1, Lines 53-65). It would have been obvious to modify Maki to include telemetry means including an electric wireline and a surface processor as taught by Priest instead of a downhole microprocessor as an alternative way to process the data obtained from the transducer.

With regard to claim 10, Maki discloses that the beam generator comprising a rotating transducer for rotating in a 360 phase within the tubular (Column 8, Lines 35-50; Column 4, Lines 1-20).

With regard to claim 11, Maki discloses means (Fig. 8) operatively associated with the beam generator, for recording the sonar data set (Column 3, Lines 45-50; Columns 6-7).

With regard to claim 12, Priest discloses that the telemetry means is an electric line 6 connected at a first end to the acoustic fan beam generator 24 and at a second end to the surface processor 8 (Fig. 1) (Column 3, Lines 29-41). Priest discloses that the surface processor contains means for converting the sonar data set to an amplitude file (Column 4, Lines 45-55; Column 9, Lines 1-23). Priest discloses that the magnitude or amplitude of the signals is recorded and processed at the surface. Maki discloses this same process, but taking place in a downhole processor instead of the surface (Column 8, Lines 50-63) (Column 6, Line 56 to Column 7, Line 57). It would have been obvious to modify Maki to include the wireline telemetry and surface processor of Priest instead of a downhole processor in order to process the data at a central computer on the surface.

With regard to claim 13, Maki discloses that the processor includes an amplitude comparing means for comparing the amplitude file of the sonar data set (Column 3, Lines 40-56; Columns 5-6) (Figs. 5-7). It would have been obvious to use a surface process instead of the downhole processor as discussed above.

With regard to claim 14, Maki discloses that the beam generator time tags the data set and the surface processor synchronizes the time tagged data set with the amplitude file (Column 7, Lines 39-56; Column 6, Lines 56-68; Column 8). Maki discloses a timing controller that signals when to generate the pulses and times when the signals are created. This timing data is transmitted to the processors, and therefore the timing of the reflection events is tagged.

With regard to claim 15, Maki does not disclose that the rotating transducer obtains samples at a rate of approximately 35 KHz. Maki does disclose that the transducer obtains samples of the reflected pulses, and it would have been obvious to record these samples at different frequencies, including 35 KHz, based on the speed of the processors being used in the data acquisition.

Allowable Subject Matter

Claims 16-23 are allowed.

Claims 4-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 4 and 16 include the limitation of setting a window with the leading edge being six samples before the calculated position of the initial pipe wall reflection of the acoustic pulse, through to seventeen samples beyond the position of the initial pipe wall

reflection of the acoustic pulse in time, so that a sample window of twenty-four samples is provided. The closest prior art did not disclose setting a window with a leading edge defined in this way that lasted for 24 samples.

Claim 7 includes a limitation also relating to a window length of 24 samples that was not disclosed by the closest prior art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kimball, who discloses determining the impedance of a material behind a casing.

Mandal, who discloses a rotating transducer for use in determining cased bond impedance.

Wright, who discloses a method for acoustic investigation of the casing cemented in a borehole.

Birchak, who discloses an acoustic tool for use in a borehole with a tubular.

O'Sulliven, who discloses a well inspection method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (571) 272-6979. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAH

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